

B1 device failure in extreme cases. It would be desirable to provide electroplating processes that reduce or avoid such problems.

Please replace the paragraph at page 4, line 25 to page 5, line 2 with the following paragraph.

While a typical Cu seed layer onto which Cu is electroplated is 1000 Å to 3000 Å thick, the feature widths to be plated are commensurate in size. Present features are around 3000 – 4000 Å (0.3 – 0.4 micron, μm) and future features are expected to be in the range 1000 – 2000 Å. Thus, the number and size of the features can have a significant fractional effect on the projected surface area to be bottom-up fill electroplated and, therefore, on the current that must be delivered to effect electroplating in a reasonable time.

Please replace the paragraph at page 11, lines 14-17 with the following paragraph.

B3 FIG. 34 is a comparison of Hollow Cathode Magnetron ("HCM") PVD deposition with Ionized Magnetized Plasma ("IMP") PVD deposition showing more severely discretized films on the feature walls resulting from the IMP process as well as more pronounced necking effects.

Please replace the paragraph at page 12, lines 22-24 with the following paragraph.

B4 FIG. 47 relates to phase 1 entry phase and an induction period of 2 seconds following the entry of the wafer into the plating bath before a current of 7 amps is turned on. Poor film nucleation is observed. Electroplating bath conditions are given. MLO and MD are components of Enthone Cu-Bath-SC™.

Please replace the paragraph at page 31, line 27 to page 32, line 8 with the following paragraph.

B5 According to one model, it is believed that additives 114 are consumed, e.g. reduced, during electroplating. In particular, it is believed that additives 114 are consumed as a necessary side reaction to the electroplated copper deposition reaction. The additive 114 consumed must be replenished by diffusion of additive 114 from the bulk of solution 112. As shown in FIG. 9, additive 114 diffuses into via 16 and replenishes any additive 114 consumed in via 16 near field region 22. However, there is insufficient diffusion of additive 114 into